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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/506,634	09/03/2004	Adrian Flanagan	60091.00344	3420

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EXAMINER	
VAUTROT, DENNIS L	

ART UNIT	PAPER NUMBER
2167	

DATE MAILED: 05/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

ℰ

Office Action Summary	Application No.	Applicant(s)
	10/506,634	FLANAGAN, ADRIAN
	Examiner	Art Unit
	Dennis L. Vautrot	2167

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 03 September 2004.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 13-24 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 13-24 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 03 September 2004 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 9/3/2004.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: British English is used throughout the specification. While change is not required according to MPEP 608.01, appropriate correction is suggested.

Claim Objections

2. Claims 13, 15, 17-19, and 23 are objected to because of the following informalities: British English is used instead of American English. Appropriate correction is suggested.

3. Claim 13 is objected to because of the following informalities: The use of the word "they" in line 6 of claim 13 is not clear as to what "they" refers to. Examiner interpreted it to mean "weigh vectors" for examination purposes. Appropriate correction is required.

Information Disclosure Statement

4. The information disclosure statement (IDS) submitted on 3 September 2004 has been received and entered into the record. Since the IDS complies with the provisions of MPEP § 609, the references cited therein have been considered by the examiner. See attached forms PTO-1449.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 13-24 are rejected under 35 U.S.C. 102(b) as being anticipated by **Guiver et al.** (US 5,809,490).

7. Regarding claim 13, **Guiver et al**. teaches a computer-implemented method for determining cluster centres in a first data structure, wherein the first data structure comprises a lattice structure of weight vectors that create an approximate representation of a plurality of input data points (See column 7, lines 4-9 "In the Kohonen SOM, input points that are close in the P dimension are mapped close together on the Q dimension lattice. Each lattice cell is represented by a neuron associated with a P dimensional adaptable weight vector.");

the method comprising: performing a first iterative process for iteratively updating the weight vectors such that they move toward cluster centres (See column 10, lines 6-12 "In each pass through the network, the node with a minimum distance between the input and its weight vector is considered the winner. Every node in the neighborhood is updated so that their weight vectors move toward the winner's vectors.");

performing a second iterative process for iteratively updating a second data structure utilizing results of the iterative updating of the first data structure (See column 6, lines 11-17 "Additionally, the present invention also contemplates that an iterative approach can be used to determine K. Using this approach, the clusterized data is used to create one analyzer or model while a sub-set of the data, preferably a subset with a new cut-off level K, is picked and used to create a second analyzer or model. This process can be performed in many iterations.");

and determining, on the basis of the second data structure, the weight vectors that correspond to cluster centres of the input data points (See column 9, lines 23-29 "In Step 190, the routine updates weights of all neurons in the neighborhood of the winning neuron according to the following learning rule:....")

8. Regarding claim 14, **Guiver et al**. teaches each iteration in the first iterative process comprises: selecting a winner weight vector for each data point on the basis of

the distance between the data point and the weight vectors (See column 8, lines 4-14 "Each neuron computes the Euclidean distance between the input vector X and the store weight vector W. Now the Euclidean distance D_i is computed for each of the N Kohonen neurons.... The neuron with the lowest value of D_i is selected as the winner.");

and calculating a next value for each weight vector on the basis of the current value of the weight vector and a first neighbourhood function of the distance on the lattice structure between the weight vector and the winner weight vector (See column 8 lines 18-22 "Once the neuron with the smallest adjusted distance has been determined, the routine then determines the remaining neurons whose weights need to be adjusted. The neurons to be adjusted is determined using a neighborhood function..."); and

the second data structure comprises a first coefficient for each of the weight vectors in the lattice structure (See column 9, lines 48-50 "After weights of the neighboring neurons have been adjusted, the learning coefficient Alpha is maintained or decreased over each iteration in step 194."); and

each iteration in the second iterative process comprises calculating a next value of each first coefficient on the basis of: the current value of the first coefficient; and a combination of: a first coefficient of the winner weight vector, a second neighbourhood function of the distance on the lattice structure between the weight vector and the

winner weight vector (See column 9, lines 21-29 "This neighborhood size is reduced during the learning process to arrive at a single neuron. In step 190, the routine updates weights of all neurons in the neighborhood of the winning neuron according to the following learning rule:..."), and

an adjustment factor for adjusting convergence speed between iterations (See column 9 line 66 – column 10 line 2 "The neighbors of the winning neuron also adjust their weights to be closer to the same input data vector. The adjustment of neighboring neurons is instrumental in preserving the order of the input space in the SOM.")

9. Regarding claim 15, **Guiver et al**. teaches the step of determining the weight vectors that correspond to cluster centres comprises selecting local maxima in the second data structure (See column 9, lines 54-56 "Next, the routine determines whether the change in the weight values is less than a predetermined threshold in step 198." Examiner interprets the "threshold" of the reference to be equivalent to the "local maxima" from the claim language.)

10. Regarding claim 16, **Guiver et al**. teaches the combination is or comprises multiplication (See column 9, line 27-28).

11. Regarding claim 17, **Guiver et al**. teaches the second neighbourhood function is not monotonous (See column 4, lines 61-63 "In step 224, the routine normalizes the

augmented data. Preferably, the variables are normalized so that they are mean zero, and have values between –1 and +1." Based on paragraph [0020] of the instant application publication, examiner interprets monotonous to mean that some values are negative. Specifically the line "A preferred version of the second neighbourhood function is not monotonous, but gives negative values at some distances.")

12. Regarding claim 18, **Guiver et al**. teaches A method according to claim 14, wherein the first coefficients are limited to a range [0,1] and the second neighbourhood function gives negative or positive values, respectively, for some distances (See column 4, lines 61-63 "In step 224, the routine normalizes the augmented data. Preferably, the variables are normalized so that they are mean zero, and have values between –1 and +1.")

13. Regarding claim 19, **Guiver et al**. teaches the second neighbourhood function depends on the number of prior iterations (See column 9, lines 54-60 "Next, the routine determines whether the change in the weight values is less than a predetermined threshold in step 198. If not, the routine further determines whether a predetermined maximum iteration limit has been reached in step 200. If the iteration threshold has not been reached, the routine loops back to step 188 to continue the training process").

14. Regarding claim 20, **Guiver et al**. teaches the input data points represent real-world quantities (See column 3, lines 51-60 "As shown in FIG. 1, in the event that the

computer system is operating in a chemical plant, the collected data my include various disturbance variables such as feed stream flow rate as measured by a flow meter, a feed stream temperature as measured by a temperature sensor, component feed concentrations as determined by an analyzer, and a reflux stream temperature in a pipe as measured by a temperature sensor. The collected data can also include controlled process variables such as the concentration of produced materials, as measured by analyzers 48 and 66." The above are examples of real world quantity data points.)

15. Regarding claim 21, **Guiver et al**. teaches the first data structure is or comprises a self-organizing map (See column 6, lines 64-67 "Turning now to the clusterizer..., the custerizer is preferably a neural network known by those skilled in the art as a Kohonen self organizing map (SOM), shown in more detail in figure 5.")

16. Regarding claim 22, **Guiver et al**. teaches estimating an upper limit K for the number of clusters in the self-organizing map (See column 6, lines 8-11 "It also computes a cutoff level K in step 252. As previously indicated, the cut-off level K is selected as some fraction of the average number of examples per cluster such as 70%." Examiner interprets the "cutoff level" to be equivalent to the "upper limit" as described in the claim.);

defining a coefficient vector .THETA.i=(.theta..sub.i,1, .theta..sub.i,2, ...theta..sub.i,K) for each weight vector i in the self-organizing map, the coefficient vector comprising K

second coefficients .theta..sub.i,l, each of which represents a weighting between the weight vector i and a label l (See column 9, lines 48-53 "After weights of the neighboring neurons have been adjusted, the learning coefficient alpha is maintained or decreased over each iteration in step 194. For instance, alpha may start at a value such as 0.4 and decrease over time to 0.1 or lower. Similarly, the neighborhood $N_{cicj}(t)$ is either maintained or shrunk in step 196."); and

assigning cluster label l to weight vector i if: l=arg max .theta..sub.i,k. 1.ltoreq.k.ltoreq.K (See column 10, lines 27-30 "The Kohonen neuron with the minimum distance is called the winner and has an output of 1.0, while the other Kohonen neurons have an output of 0.0") - In the instant application, the cluster label l is referred to as the "winner".)

17. Regarding claim 23, **Guiver et al**. teaches a method according to claim 22, wherein each iteration in the second iterative process comprises calculating a next value of each second coefficient on the basis of the current value of the second coefficient and a combination of: a coefficient of the winner weight vector, a third neighbourhood function of distance (See column 10, lines 6-12 "In each pass through the network, the node with a minimum distance between the input and its weight vector is considered the winner. Every node in the neighborhood is updated so that their weight vectors move toward the winner's vectors"); and

an adjustment factor for adjusting convergence speed between iterations (See column 9 line 66 – column 10 line 2 "The neighbors of the winning neuron also adjust their weights to be closer to the same input data vector. The adjustment of neighboring neurons is instrumental in preserving the order of the input space in the SOM.")

18. Regarding claim 24, **Guiver et al**. teaches a computer-readable program product comprising a computer program code, wherein executing the computer program code in a computer causes the computer to carry out the steps of the method according to claim 13. (See column 4, lines 17-20 "The system controller is also connected to an IDE interface port for driving one or more hard disk drives, preferably a CD-ROM player and a disk drive.")

Conclusion

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Fayyad et al. (US 6,012,058) teaches two data structures and column 10 appears very similar to claim 1. Specifically, it teaches one data structure updating from another. The extended K-means of Figure 7 also appears similar in concept.

Fayyad et al. (US 6,581,058) teaches using multiple data structures to determine cluster centers. Examiner was unable to find anything similar to the neighborhood function or winning vector, however.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis L. Vautrot whose telephone number is 571-272-2184. The examiner can normally be reached on Monday-Friday 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Cottingham can be reached on 571-272-7079. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dv
12 May 2006

JOHN R. COTTINGHAM
PRIMARY EXAMINER